

SCISSORS LIFTING [TABLE] DEVICE5 Field of Invention

The invention pertains to a scissors lifting table device with at least one pair of scissors arranged between a [carrying device] carrier unit and [the] a base unit[,]. The [wherein said] scissors [contain two pairs of legs] comprise two arms that can be pivoted relative to one another about a scissors axle or axis[, and with a lifting device
10 that contains]. The lifting device further includes a lifting truck which can be moved [backward and forward] in opposite directions by means of a drive in order to open and close the scissors[, wherein the drive drives]. The drive powers a [stationary] drum that is aligned parallel to the scissors axis and serves to move at least one [traction means] band that extends around [this] the drum and is coupled to the lifting
15 truck at one end[, and wherein the traction means can be]. The band is wound onto the drum by means of the drive in order to open the scissors by pulling the lifting truck [in the direction of] toward the scissors [axis, and] axle. The band is unwound from the drum in order to close the scissors [by moving] through movement of the lifting truck in the opposite direction, i.e., away from the scissors [axis] axle.

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Background of the Invention

A scissors lifting table device [of this type] is described in DE 604 156 C. In this known scissors lifting table, lifting rollers that extend parallel to a scissors axis are arranged on both sides of [this] the scissors axis between the [scissor legs] scissors
25 arms. These lifting rollers can be moved toward one another by means of a cable arrangement [that is realized] in the form of a block and pulley so as to lift [a] the carrying device of the scissors lifting table[, and]. The lifting rollers can be moved apart from one another so as to lower [said] the carrying device. For this purpose, one end of the cable is connected to a take-up drum that is powered by means of a drive.
30 The cable extends over several guide elements before it reaches the take-up drum.

In another scissors lifting table that is described in [US-A] U.S. Patent No.

3,785,462, one end of a traction cable [that] is fixed to and wound up at a lower shaft [at one end is wound up at either side of this lower shaft]. The traction cable extends around several other deflection rollers [, among other things,] and a roller-shaped lifting element that can be moved [backward and forward] between the [scissor legs, with the] scissors arms. The other end of the traction cable [being] is fixed to the upper section of the lifting table. When the [traction means are] cable is wound/unwound onto/from the lower shaft that is powered by means of a drive and a chain, the lifting element is respectively moved toward or away from the scissors axis such that the carrying device of the lifting table is lifted or lowered.

10 Another scissors lifting table for lifting and lowering loads is described in DE 90 05 566 U1. In this known scissors lifting table, a platform that accommodates the load is respectively lifted and lowered by [means] opening and closing the scissors arms of two lateral scissors [that are] arranged in parallel [to one another, namely by opening and closing the scissor legs]. The scissors are opened and closed by means of
15 a lifting sled or lifting truck that is moved backward and forward between longitudinal side braces of a base unit. On its upper side, the lifting truck is provided with obliquely extending lifting cams[, which cooperate with rollers for lifting and lowering the platform[, that]]. The lifting cams are [arranged in the vicinity of] positioned near the scissors axis. The lifting sled is powered by means of a drive via a threaded spindle.
20 Such a spindle [represents] is a precision part and is usually supported in a ball bearing inside [of] a spindle nut. A spindle drive of this type is relatively costly and is so sensitive to transverse forces and vibrations [such] that the smooth operation of the spindle drive may [become] be impaired and the spindle drive [is] damaged by such forces.

25 A scissors lifting table with a hydraulic actuator is described in DE 44 13 527 A1 and in DE 83 29 409 U1. A hydraulic actuator of this type [usually] typically causes jerks at the beginning and end of the [movement] opening and closing movements, and may also cause undesirable oily deposits.

30 Summary of the Invention

The [invention is based on the] objective of [making available] this invention is

to provide a scissors lifting table of the initially described type that ensures a reliable and controlled lifting movement.

This objective is attained [with the characteristics of Claim 1. According to this claim,] through the inventive arrangement of a carrier unit and base unit interconnected
5 by at least one pair of scissors arms, a drum for winding traction means to provide a force, and a lifting truck positioned between the scissors arms so that it can be pulled toward the scissors axis by the traction means. It is preferred that only one lifting truck is provided [, which is arranged on the side of the scissors axis that faces away from the drum,] and that the traction means [are realized in the form of] is a band [and
10 extend] that extends directly from the drum to the lifting truck.

[Because of these measures,] This construction allows the beginning and the end of the lifting and lowering movement [can] to be controlled in a superior fashion while simultaneously achieving a more robust and less expensive design. [If] In addition, if at least two [band-shaped] band-like traction means are utilized in a parallel
15 fashion, the lifting table [is still able to operate temporarily] can continue to operate when one of the traction means is damaged.

The lifting movement can be [influenced in the] controlled to operate in a desired fashion [due to the fact that the lifting truck is guided by means] by the use of lifting cams [that] which guide the lifting truck and are arranged on the lower [leg] arm
20 sections of one pair of [legs] parallel arms, [or] on the upper [leg] arm sections of the other pair of [legs] parallel arms, or [on the leg sections of] in both [pairs of legs] positions. For example, through use of a specific design of lifting cams a constant lifting load can be achieved [in this fashion,] wherein the tensile stress in the [band-shaped] band-like traction means remains constant in all lifting and lowering
25 positions. [In this case,] To provide this capability, the lifting cams may be [realized adjustably and/or exchangeably] adjustable or exchangeable in order to vary the movement sequence or the load [, respectively].

Another advantageous [embodiment is characterized by] characteristic of the invention is the fact that the drum is arranged [on a] at the lower fixed pivot [axis of
30 one pair of legs, or outside this] shaft where one of the arms pivotably connects to the base unit. Alternatively, the drum is arranged "outside" the lower fixed pivot shaft so

that the lower fixed pivot shaft is between the drum and the lifting truck. If a fixed pivot [axis] shaft is used to support the drum, additional bearing elements can be eliminated. Under certain circumstances, the arrangement wherein the drum is positioned outside the pivot [axis] shaft may be advantageous with respect to maintenance considerations or guidance of the band.

[Favorable] Superior control of the drive is achieved due to the fact that the drive contains a frequency-controlled electric motor. [In this case,] When utilizing a frequency-controlled electric motor, high lifting speeds [, as well as] and very precise positioning[,] can be achieved.

In order to achieve a controlled lowering movement and to conform with applicable safety standards, it is [advantageous] preferred that the drive be provided with a brake for lowering the carrier unit in a controlled fashion.

[Safety is additionally] In addition, safety is improved due to the fact that a catch device is provided for preventing an uncontrolled lowering movement.

Brief Description of Drawings

The invention is described below with reference to one embodiment that is illustrated in [the figure] Figure 1 as a side view.

Detailed Description of Preferred Embodiments

[The figure] Figure 1 shows a side view of a scissors lifting [table] device that contains a platform or a [carrying device, respectively,] carrier unit for accommodating a load. The [carrying device] carrier unit contains lateral [carriers] supports 10, to which the upper ends of [a first and a second pair of legs] two first arms 1 [, 2] and two second arm 2 are connected [in an articulated fashion]. The [left leg ends of the second pair of legs] upper ends of arms 2 are [, for example,] supported on [a] upper fixed pivot [axis] shafts[, with] and the [right leg ends of the first pair of legs] upper ends of arms 1 [being] are conventionally movably supported in a pivotable fashion in the [carriers] supports 10 on rollers or pins. The lower [leg] ends of both arms 1,2 are supported in lateral rails 11 of a base unit[, wherein the left lower leg]. The lower ends [of the first pair of legs] of first arms 1 are supported on [a] lower fixed pivot [axis]

shafts 7 and the [right] lower [leg] ends of [the] second [pair of legs] arms 2 are movably supported in a pivotable fashion on the rail 11, for example, on rollers. [The two pairs of legs] Each reciprocal pair of arms 1,2 are connected at a scissors [axis] axle 6 such that they can be pivoted relative to one another.

5 In order to lift and lower the [carrying device] carrier unit or to open and close the two reciprocal pairs of scissors formed by the two pairs of [legs] arms 1,2, respectively], a lifting truck 3 is displaceably or movably arranged between the [sides of the first and the second pair of legs 1, 2] upper portions of arms 1 and the lower portions of arms 2 that face one another. In [this case] addition, suitable lifting cams 10 8,9 for influencing the movement or the load[, respectively,] are arranged [between the edges of the pairs of legs] along the sides of the arms 1,2 [,] which face one another [wherein] so that the lifting truck 3 is guided on [said] the lifting cams.

The lifting truck 3 is pulled toward the scissors [axis] axle 6 by means of one or more traction bands 4 that, if applicable, lie adjacent to one another[, so as to lift].
15 Movement of the lifting truck toward the axle 6 lifts the [carrying device] carrier unit and [to open] opens the scissors[, respectively]. [In this case,] In the drawing the tension [band(s)] bands 4 [is/are] are wound up by means of a drum 5 [that]. Drum 5 is arranged on the [other] far side of the scissors [axis] axle 6 with reference to the lifting truck 3[, wherein said drum] and is coupled to a drive 12. In order to lower the 20 carrying device and [to] close the scissors, [respectively,] the lifting truck 3 [moves] is forced away from the scissors [axis] axle 6 due to the dead weight of the [scissors lifting table such that the] arms 1,2 and carrier unit 10 when tension bands 4 are unwound from [the] drum 5. [In this case,] During this lowering action the drive 12 or a corresponding transmission thereof may act as a brake, or a separate brake may be 25 provided.

The drive 12 preferably contains a frequency-controlled electric motor that makes it possible to achieve high lifting speeds and highly precise positioning. The start of the lifting or lowering movement and the movement sequences can be programmed by means of a corresponding control device. In [this case] particular, a soft start and 30 stop can[, in particular, also] be programmed for the initial phase and the final phase of the respective movements.

The drum 5 may be supported on the fixed pivot [axis] shaft 7 or separately from it. In order to prevent an uncontrolled lowering movement of the [carrying device] carrier unit 10, it is [advantageous to provide] preferred that a catch device that becomes effective during a fast lowering movement is provided.

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Claims

Add B, 7

SEE ATTACHED PRELIMINARY AMENDMENT

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ABSTRACT

5 The invention relates to a scissors-like [lift table with] lifting device having a pair of scissors that [is] are arranged between a carrier or support [device (10)] unit and a base unit [(11)]. [Said] Each pair of scissors is provided with two [pairs of limbs (1,2)] arms which can be pivoted about [an axle] corresponding axles [(6) pertaining to the scissors and in relation with one another]. The scissors-like [lift table also comprises a] lifting device [which] is provided with a lifting [vehicle (3)] truck that can be moved [to and fro] by means of a drive [device (12)] in order to open and close the

10 scissors. The [aim of the invention is to] inventive configuration efficiently [control] controls the lifting movement. The [band-shaped] band-like traction mechanism [(4)] can be wound-up [n] on the [roller (5)] drum by means of the drive [device (12) and by drawing] in order to pull the lifting [vehicle (3)] truck towards the scissors axle [(6) of the scissors in order to open] so that the scissors [and] are opened. The band-like

15 traction device can be unwound from the [roller (5)] drum so that the truck is moved away from the scissors axle [(6) of the scissors] by the [means of the movement] force of [the lifting vehicle (3) in order to close] gravity on the support and arms thereby closing the scissors.

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